



Topic: AGRONOMY # 56
Subject: Conservation Planning Considerations for Pest Management in Organic Farming
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INTRODUCTION

Pest management in an organic crop production system relies on the principles of Integrated Pest Management (IPM). This involves strategic planning and use of management strategies for weeds, insects and diseases, based on knowledge of the pest life cycle, economic population thresholds, and control measures that will minimize or mitigate adverse effects on the crop and the environment. The NRCS Pest Management (595) practice standard fits well in an organic farming system.

Disclaimer: The information given in this technical note is current as of October 2010. Producers should always consult with their organic certifying agency, to assure that they are following NOP rules. Organic production practices and materials need to be approved by a USDA-approved organic certifying agency and written into an Organic System Plan. Each certifying agency has different interpretations on approved control methods and materials.

The ‘PAMS’ Approach

The organic regulation mandates that a specific pest control hierarchy be used. Growers must start with cultural, mechanical and biological pest management methods. If these methods are documented as ineffective, then natural inputs can be used. If natural inputs are not effective, then approved synthetics can be used as a last resort.

The NRCS Pest Management (590) practice standard groups the first tier of pest management techniques under the acronym ‘PAMS’ which is short for Prevention, Avoidance, Monitoring, and Suppression. Examples of these techniques can be summarized as follows:

- Prevention – Activities such as cleaning equipment and gear when leaving an infested area, using pest-free seeds and transplants, and irrigation management to limit situations that are conducive to disease development.

- Avoidance – Activities such as maintaining healthy and diverse plant communities, using pest resistant varieties, and crop rotation.
- Monitoring – Activities such as pest scouting, degree-day modeling, and weather forecasting to help target suppression strategies and avoid routine preventative treatments.
- Suppression – Activities such as the judicious use of cultural, mechanical, and biological control methods that reduce or eliminate a pest population or its impacts while minimizing risks to non-target organisms.

Pest management strategies are integrated into an Organic System Plan based on the specific crops grown and farm-specific conditions. A good source of information on organic pest control strategies for specific crops can be found at the National Sustainable Agriculture Information Service (<http://www.attra.org>).

Weed control practices can be difficult, especially during the transition phase. Growers who are just starting to use a field for organic production should start with as ‘clean’ a field as possible. Most field crop systems rely on tillage for weed control. Another mechanical method available for weed control is flaming. In fruit and vegetable production, tillage, hand weeding and use of mulches can reduce weed pressure. Plastic is allowed as a mulching material as long as it is removed from the field at the end of the season.. Crop rotations and cover crops can also reduce weed populations. In some instances of high perennial weed infestation, growers may find it worthwhile to fallow a field for a year to focus on lowering weed populations.

Insect control relies on IPM principles such as knowing the pest life cycle and most vulnerable stage of life for best control. Growers must rely on an intensive scouting program to detect pest infestations early. Growers will need to use cultural and management strategies that limit crop damage. For example, timing of planting crops sooner or later may avoid peak pest populations. Physical barriers such as netting or cloth covers may exclude insects. Increased planting rates may compensate for more damage. Mechanical methods of insect control include vacuuming or hand picking.

Knowing the beneficial organisms that prey on particular insects may provide biocontrol options. Some growers will release large numbers of predator insects such as ladybeetle for aphid control, a kind of biological ‘pesticide’. Improved habitat for promoting beneficial insect populations can include native wildflower and grass planting in field borders or within other buffer practices.

Disease control also relies on IPM principles. Growers must use an intensive scouting program and rely on preventative measures as much as possible, since there are few control measures available once a plant has become infected and begins showing symptoms. Cultural practices include crop rotation, disease resistant varieties and use of disease free transplants. Seed treatments with synthetic materials are prohibited.

Organic Approved Pest Management Materials

One misperception of organic farming is that pesticides are never used. As noted above, natural pesticide materials can be used if there is documented evidence that cultural, biological or mechanical methods are not effective. The goal of a pesticide application in an organic system is to suppress the target pest population to a tolerable level while protecting other onsite and offsite natural resources.

As a general rule, growers can use natural materials so long as they are not prohibited, and synthetic materials are prohibited unless allowed. The National Organic Standards Board is responsible for maintaining a 'list' of approved materials. The list is available on the NOP website. Materials may be approved, restricted or prohibited. An example of a natural material that is prohibited is tobacco dust, because of toxicity to humans.

Table 3 shows examples from the NOP list of approved materials, along with the target pest. Restrictions are noted where applicable.

Organic Approved Pest Management Material	Use	Status
Antibiotics – streptomycin and terremycin	Fungicide - fire blight on tree fruit	R – emergency treatment
Bacillus thuringensis (B.t.)	Insecticide - selected caterpillar species	
Sodium bicarbonate	Fungicide - powdery mildew	
Bordeaux mix – copper sulfate and hydrated lime	Fungicide	R – prevent copper buildup in soil
Codling moth granulosis virus	Insecticide - codling moth	
Copper (hydroxide or sulfate)	Fungicide, bactericide	R – prevent copper buildup in soil
Diatomaceous earth	Insecticide	
Hydrogen peroxide	Insecticide	Synthetic but allowed
Garlic, pepper, other herb extracts	Insecticide	
Kaolin clay	Physical barrier on fruit to prevent insect damage	
Lime and lime-sulfur	Fungicide	
Neem or azadirachtin	Insecticide	

Oils	Insecticide	Some synthetic, but allowed
Pheromones	Insect management tool (in pest monitoring system)	Synthetic but allowed
Pyrethrum	Insecticide	NOTE: synthetic pyrethroids are prohibited
Soaps (pesticidal)	Insecticide, herbicide	Synthetic but allowed
Sulfur	Fungicide	Synthetic but allowed

Table 3. Selected organic approved pest management materials R=Restricted (References: NOP Rules; Cornell Resource Guide for Organic Insect and Disease Management: Material Fact Sheets)

The Organic Materials Review Institute (OMRI) is a nonprofit organization that conducts independent reviews of commercial products intended for use in certified organic production. Companies apply to OMRI to have their products reviewed against the NOP standards. Accepted products are listed on the OMRI website at <http://www.omri.org>. Be aware though, that organic certifying agencies have different interpretations of NOP standards. Growers should always get prior approval from their organic certifier before using a product from the OMRI list.

Selected Resources Available

Michigan State University Extension Bulletin E3065, Integrated Weed Management: Fine Tuning the System

Michigan State University Extension Bulletin E3983, Building a Sustainable Future: Ecologically Based Farming Systems

ATTRA – National Sustainable Agriculture Information Service <http://www.attra.org>

USDA-Agricultural Marketing Service, National Organic Program:
<http://www.ams.usda.gov/AMSv1.0/ams.fetchTemplateData.do?template=TemplateA&navID=NationalOrganicProgram&leftNav=NationalOrganicProgram&page=NOPNationalOrganicProgramHome&acct=AMSPW>

Organic Materials Review Institute (OMRI), <http://www.omri.org>